

# **BICYCLE FIXING RACK ASSEMBLY FOR WHEELED VEHICLE**

## **BACKGROUND OF THE INVENTION**

### **1. Field of the Invention**

The present invention relates to a bicycle fixing rack assembly, and  
5 more particularly to a bicycle fixing rack assembly for a wheeled vehicle, such  
as the automobile or the like.

### **2. Description of the Related Art**

A conventional bicycle fixing rack is mounted on a wheeled vehicle,  
such as the automobile or the like, for supporting and fixing a bicycle, so that  
10 the bicycle can be mounted on the wheeled vehicle by the bicycle fixing rack.

However, the conventional bicycle fixing rack has a fixed size  
without adjustment, so that the conventional bicycle fixing rack is not suitable  
wheeled vehicles of different sizes, thereby greatly limiting the versatility of  
the conventional bicycle fixing rack.

## **SUMMARY OF THE INVENTION**

15 The primary objective of the present invention is to provide a bicycle  
fixing rack assembly having an adjustment function, so that the bicycle fixing  
rack assembly is suitable wheeled vehicles of different sizes.

Another objective of the present invention is to provide a bicycle  
20 fixing rack assembly, wherein the seat tube of the bicycle is clamped between  
the two clamping blocks of the respective clamping unit, and the bicycle is  
fixed by the respective clamping unit rigidly and stably without detachment.

A further objective of the present invention is to provide a bicycle fixing rack assembly, wherein the inclined angle of each of the two pivot units can be adjusted arbitrarily, so as to fit the inclined angle of the wheeled vehicle.

A further objective of the present invention is to provide a bicycle  
5 fixing rack assembly, wherein the clamping head of one of the clamping units can be pivoted to clamp the support bar of the support rack of the main frame, so as to fold the main frame.

In accordance with the present invention, there is provided a bicycle fixing rack assembly, comprising a main frame, and a plurality of clamping  
10 units, wherein:

the main frame includes an inverted U-shaped first adjusting rack;  
and

each of the clamping units is mounted on the first adjusting rack of the main frame and includes a snapping member pivotally mounted the first  
15 adjusting rack of the main frame, an extension bolt having a first end secured on the snapping member, a fixing tube mounted on the extension bolt and having a first end rested on the snapping member, a clamping head mounted on the extension bolt and rested on a second end of the fixing tube, and a control knob mounted on a second end of the extension bolt and rested on a bottom of  
20 the clamping head.

Further benefits and advantages of the present invention will become apparent after a careful reading of the detailed description with appropriate reference to the accompanying drawings.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

5            Fig. 1 is a perspective view of a bicycle fixing rack assembly in accordance with the preferred embodiment of the present invention;

            Fig. 2 is an exploded perspective view of the bicycle fixing rack assembly as shown in Fig. 1;

            Fig. 3 is a partially plan cross-sectional view of the bicycle fixing  
10    rack assembly as shown in Fig. 1;

            Fig. 4 is a partially cut-away plan operational view of the bicycle fixing rack assembly as shown in Fig. 1;

            Fig. 5 is an exploded perspective view of a rotation member of the bicycle fixing rack assembly as shown in Fig. 1;

15           Fig. 6 is a plan cross-sectional view of the rotation member of the bicycle fixing rack assembly as shown in Fig. 5;

            Fig. 7 is a plan assembly view of the rotation member of the bicycle fixing rack assembly as shown in Fig. 6;

            Fig. 8 is a plan assembly view of the rotation member of the bicycle  
20    fixing rack assembly as shown in Fig. 5;

            Fig. 9 is an exploded perspective view of a clamping unit of the bicycle fixing rack assembly as shown in Fig. 1;

Fig. 10 is a partially cut-away plan cross-sectional assembly view of the clamping unit of the bicycle fixing rack assembly as shown in Fig. 9;

Fig. 11 is a schematic operational view of the clamping unit of the bicycle fixing rack assembly as shown in Fig. 10;

5 Fig. 12 is a side plan view showing the bicycle fixing rack assembly being mounted on a wheeled vehicle;

Fig. 13 is a side plan view showing the bicycle fixing rack assembly being mounted on a wheeled vehicle;

10 Fig. 14 is a front plan view of the bicycle fixing rack assembly as shown in Fig. 13;

Fig. 15 is a perspective folded view of the bicycle fixing rack assembly as shown in Fig. 1;

Fig. 16 is a side plan view of the bicycle fixing rack assembly as shown in Fig. 15; and

15 Fig. 17 is a side plan folded view of the bicycle fixing rack assembly as shown in Fig. 1.

### **DETAILED DESCRIPTION OF THE INVENTION**

Referring to the drawings and initially to Figs. 1-3, a bicycle fixing rack assembly in accordance with the preferred embodiment of the present invention comprises a main frame 1, a plurality of X-shaped fixing plates 2, two pivot units 3, and a plurality of clamping units 4.

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The main frame 1 includes an inverted U-shaped first adjusting rack 11, a U-shaped second adjusting rack 11, and a support rack 13.

The first adjusting rack 11 of the main frame 1 has two sides each formed with a plurality of adjusting holes 111.

5        The second adjusting rack 12 of the main frame 1 is movably mounted on a lower end of the first adjusting rack 11 and has two sides each formed with a plurality of adjusting holes 121. The second adjusting rack 12 of the main frame 1 is combined with the first adjusting rack 11 by two bolts 14. The second adjusting rack 12 of the main frame 1 has a lower end provided  
10    with a crossbar 122, two hooks 123 each mounted on the crossbar 122 and each provided with a rope 124 which has a distal end provided with a claw 125.

      The support rack 13 of the main frame 1 is pivotally mounted on the first adjusting rack 11 of the main frame 1, and includes two pivot tubes 131 each pivotally mounted on the respective side of the first adjusting rack 11 by a  
15    U-shaped pivot seat 132 and two bolts 133, and a U-shaped support bar 136 movably mounted on the two pivot tubes 131. Each of the two pivot tubes 131 of the support rack 13 is formed with a plurality of adjusting holes 1311, and the support bar 136 of the support rack 13 has two sides each formed with a plurality of adjusting holes 1361. The support bar 136 is combined with the  
20    two pivot tubes 131 by two bolts 135.

      Each of the X-shaped fixing plates 2 is secured on the support rack 13 of the main frame 1 and the pivot units 3 for positioning the tires 62 of a

bicycle 60 as shown in Fig. 12. Each of the X-shaped fixing plates 2 is secured on the support rack 13 of the main frame 1 by two bolts 21 as shown in Fig. 3.

Referring to Figs. 4-8 with reference to Figs. 1-3, each of the two pivot units 3 is pivotally mounted on the first adjusting rack 11 of the main frame 1, and includes a rotation member 31 secured on the respective side of the first adjusting rack 11, an outer tube 33 secured on the rotation member 31, an inner tube 32 movably mounted on the outer tube 33, and a fixing member 34 secured on the inner tube 32.

The rotation member 31 of each of the two pivot units 3 includes a semi-spherical first body 312 formed with a U-shaped recess 3122 for receiving the respective side of the first adjusting rack 11, and a semi-spherical second body 311 pivotally mounted on the first body 312 and provided with a mounting tube 3113. The first body 312 of the rotation member 31 of each of the two pivot units 3 has a periphery formed with a plurality of cavities 3121, and the second body 311 of the rotation member 31 of each of the two pivot units 3 has a periphery formed with a plurality of bosses 3111 each inserted into a respective one of the cavities 3121.

The outer tube 33 of each of the two pivot units 3 has a first end secured in the mounting tube 3113 of the second body 311 of the rotation member 31 and a second end formed with an adjusting hole 331.

The rotation member 31 of each of the two pivot units 3 further includes a bolt 35 extended through the respective side of the first adjusting

rack 11 of the main frame 1, a hole 3123 formed in the first body 312, a hole 3112 formed in the second body 311 and the first end of the outer tube 33 of each of the two pivot units 3, and a nut 36 screwed on the bolt 35, so that the rotation member 31 of each of the two pivot units 3 is secured on the respective  
5 side of the first adjusting rack 11 of the main frame 1, the first body 312 of the rotation member 31 of each of the two pivot units 3 is combined with the second body 311, and the outer tube 33 of each of the two pivot units 3 is secured in the mounting tube 3113 of the second body 311 of the rotation member 31.

10           The inner tube 32 of each of the two pivot units 3 is formed with a plurality of adjusting holes 321. The outer tube 33 is combined with the inner tube 32 by a bolt 332.

          The fixing member 34 of each of the two pivot units 3 includes a rotation block 342 mounted on an end of the inner tube 32, a fixing block 341  
15 mounted on the rotation block 342 by a screw 344, and a claw 343 mounted on a side of the rotation block 342.

          Referring to Figs. 9-11 with reference to Figs. 1-3, each of the clamping units 4 is mounted on the first adjusting rack 11 of the main frame 1, and includes a snapping member 42 pivotally mounted the first adjusting rack  
20 11 of the main frame 1, an extension bolt 41 having a first end secured on the snapping member 42, a fixing tube 44 mounted on the extension bolt 41 and having a first end rested on the snapping member 42, a clamping head 45

mounted on the extension bolt 41 and rested on a second end of the fixing tube 44, and a control knob 46 mounted on a second end of the extension bolt 41 and rested on a bottom of the clamping head 45.

The snapping member 42 of each of the clamping units 4 has two distal ends each formed with a through hole 422 for mounting the extension bolt 41, and each of the clamping units 4 further includes a positioning block 43 mounted in an opening 421 defined between the two distal ends of the snapping member 42 and formed with a through hole 431 for mounting the extension bolt 41.

The first end of the extension bolt 41 of each of the clamping units 4 is formed with a catch head 411 rested on the snapping member 42.

The fixing tube 44 of each of the clamping units 4 is formed with a through hole 441 for mounting the extension bolt 41.

The clamping head 45 of each of the clamping units 4 includes two clamping blocks 451 each having a first end formed with an arcuate recess 4510 for securing the seat tube 64 of the bicycle 60 as shown in Figs. 11 and 12, a mediate portion formed with a stepped hole 4511 for passage of the extension bolt 41, and a second end pivotally connected with a pivot block 453 by a bolt 454, and a spring 455 mounted on the extension bolt 41 and urged between the two clamping blocks 451. Preferably, the spring 455 is received in the stepped hole 4511 of each of the two clamping blocks 451.



The control knob 46 of each of the clamping units 4 is formed with a screw bore 461, and the second end of the extension bolt 41 of each of the clamping units 4 is formed with an outer thread 412 screwed into the screw bore 461 of the control knob 46.

5           In practice, referring to Figs. 12-17 with reference to Figs. 1-11, the main frame 1 is mounted on a wheeled vehicle 5, with the claw 343 of the fixing member 34 of each of the two pivot units 3 being closely hooked on the connection of the upper portion of the wheeled vehicle 5, and with the claw 125 of each of the two hooks 123 of the second adjusting rack 12 of the main  
10 frame 1 being hooked on the opening of the lower portion of the wheeled vehicle 5. In addition, the rope 124 is adjusted by each of the two hooks 123, so that the claw 125 of each of the two hooks 123 is closely hooked on the opening of the lower portion of the wheeled vehicle 5.

At this time, the nut 36 is unscrewed from the bolt 35, to release the  
15 first body 312 of the rotation member 31 of each of the two pivot units 3 from the second body 311, so that the bosses 3111 of the second body 311 of the rotation member 31 of each of the two pivot units 3 are detached from the cavities 3121 of the first body 312.

Thus, the first body 312 of the rotation member 31 of each of the two  
20 pivot units 3 can be rotated relative to the second body 311, so as to adjust the included angle between the outer tube 33 of each of the two pivot units 3 and the first adjusting rack 11 of the main frame 1, so that the inclined angle of each

of the two pivot units 3 can be adjusted arbitrarily as shown in Figs. 12 and 13, so as to fit the inclined angle of the wheeled vehicle 5.

Each of the X-shaped fixing plates 2 is secured on the support rack 13 of the main frame 1 and the pivot unit 3 for positioning the tires 62 of the bicycle 60, and the clamping head 45 of each of the clamping units 4 can be pivoted to clamp the seat tube 64 of the bicycle 60 as shown in Fig. 12.

In assembly, the control knob 46 of each of the clamping units 4 is unscrewed from the extension bolt 41, so that the two clamping blocks 451 are moved outward relatively by the restoring force of the spring 455. Thus, the seat tube 64 of the bicycle 60 can be inserted between the two clamping blocks 451 as shown in Fig. 11. Then, the control knob 46 of each of the clamping units 4 is screwed and locked on the extension bolt 41 closely, so that the seat tube 64 of the bicycle 60 is clamped between the two clamping blocks 451, and the bicycle 60 is fixed by the respective clamping unit 4 rigidly and stably without detachment.

As shown in Figs. 15-17, the clamping head 45 of one of the clamping units 4 can be pivoted to clamp the support bar 136 of the support rack 13 of the main frame 1, so as to fold the main frame 1.

Although the invention has been explained in relation to its preferred embodiment(s) as mentioned above, it is to be understood that many other possible modifications and variations can be made without departing from the scope of the present invention. It is, therefore, contemplated that the appended

claim or claims will cover such modifications and variations that fall within the true scope of the invention.